Purpose of Study

Diabetes mellitus affects 15.7 million Americans – nearly 6% of the population.[1] The prevalence of diabetes is increasing, due in great part to the increasing number of Americans who are obese. Complications related to diabetes can be severe – including kidney failure, blindness and limb amputation. Although there is no cure for diabetes, the adverse effects of the disease can be significantly affected by lifestyle changes, medication, and regular physician care.

Diabetes affects all ages and races. However, African Americans are 1.7 and Latinos 2 times as likely to suffer from the disease as non-Latino whites. Latinos and African Americans are also more likely to suffer from complications related to the disease. Appropriate and regular care is crucial for the management of the disease to prevent complications, especially in those groups with higher risk.

Diabetes is generally classified into two types. Type I diabetes, also known as juvenile-onset diabetes or insulin-dependent diabetes mellitus (IDDM), is characterized by the production of little or no insulin by the pancreas. Type II diabetes — affecting approximately 90% of people with diabetes — is also referred to as adult-onset diabetes or noninsulin-dependent diabetes mellitus (NIDDM). NIDDM is characterized by the body's inability to produce enough insulin, or to make use of the insulin that is produced. Treatment for diabetes typically involves the use of oral hypoglycemic medications, insulin injections, or both. The classification of the disease as NIDDM does not necessarily mean that the individual will not require insulin to control blood sugar. Insulin therapy is required, however, for those individuals with IDDM, due to the destruction of beta cells in the pancreas that produce insulin.

The 2000 EQR focus study on diabetes has been completed as a follow-up to the 1998 EQR diabetes focus study. Based partially on the results from the 1998 EQR, the Michigan Association of Health Plans (MAHP) launched an effort to improve rates and outcomes for those individuals living with diabetes. Taking On Diabetes In Michigan is a project that was developed by MAHP members, health plan medical directors, and other professional and statewide organizations to achieve the above goals.

[1] American Diabetes Association. The Impact of Diabetes. [Web Page]; http://www.diabetes.org/main/application/commercewf?origin=*.jsp&event=link(B1_1). [Accessed 7 Nov 2001].

Study Population

The study population for this diabetes focus study is subject to diagnosis, age and enrollment criteria as follows:

- Enrollees must have a diagnosis of diabetes or use either an oral hypoglycemic medication or receive insulin injections.
- Enrollees must have at least one office visit during the review period.
- Enrollees are included if they were 18 or older at the end of the review period (12/31/2000).
- Continuous enrollment of 12 months during the review period in one of the health plans or Fee-For-Service is required.

A random sample of 3,229 enrollee records were abstracted to allow extrapolation of the study results to the entire Medicaid population in Michigan with a 5% error bound. The precision of results varies slightly for each indicator.

Study Questions

Diabetes study questions addressed key service components, renal function, and tobacco use status. Additional information was collected regarding influenza vaccination and diabetes treatment. Appropriate care relevant to these areas indicates compliance with 1998 guidelines as published by the American Diabetes Association (ADA).[2]

1. Did the enrollee receive the following key service components during the review period?

    - At least one foot examination.
    - At least one dilated eye examination.
    - At least one glycosylated hemoglobin test.
    - A lipid profile including cholesterol, triglycerides, and lipoproteins.

2. Did the enrollee receive an assessment of renal function during the review period?
3. Was the enrollee's tobacco use status addressed during the review period? If applicable, was the enrollee advised to quit smoking?
4. Did the enrollee receive an influenza vaccination during the review period?

The study questions were replicated from the 1998 EQR in order to allow comparisons to the previous study. These criteria were developed in accordance with guidelines from the ADA and MAHP in collaboration with the Michigan Department of Community Health (MDCH).

[2] American Diabetes Association. Standards of medical care for patients with diabetes mellitus. Diabetes Care 1998.

Data Collection

The data for this study were collected via abstraction of medical records. Additional data were collected using encounter/claims data provided by MDCH for the following procedures: glycosylated hemoglobin, lipid profile, urinalysis, microalbuminuria, influenza, and eye examination. About 32% of the medical records were abstracted on-site at physician offices, while the remaining 68% were copies that were mailed to MPRO for review.

Limitations

Study questions for 2000 EQR were nearly identical to those for the 1998 EQR study to allow for comparison between the review periods whenever possible. While the treatment guidelines for diabetes do not vary relative to the type of diabetes, it should be noted that the populations studied for 1998 and 2000 were not the same.

In the 1998 EQR, the health plans identified those enrollees with a diagnosis of diabetes using diagnosis codes provided by MPRO and their encounter/claims data. Pharmacy data could be used to help identify the population as another option, but was not required. The 2000 EQR study used diagnosis or prescription for selected medications, along with the office visit, to identify the population. The most significant difference between the two study years is that 2000 EQR required 12 months continuous enrollment, whereas the 1998 EQR study required only 6 months continuous enrollment. The 2000 EQR also used encounter data to supplement selected indicators to control the effect of the documentation limitations on the indicator rates. These factors must be considered when interpreting results in comparison with the 1998 EQR.

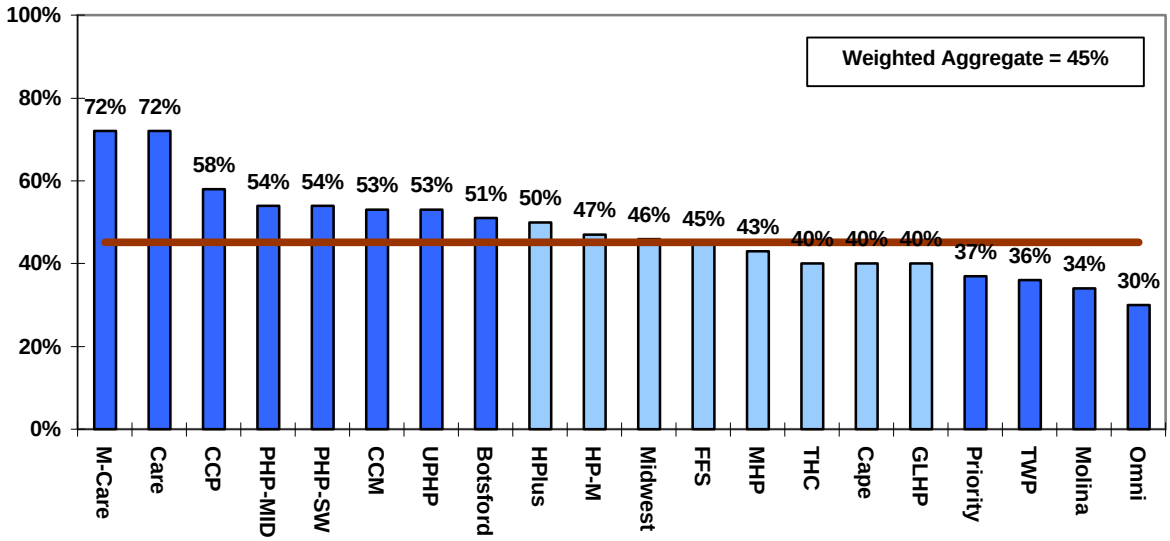
Data gathered from medical record abstraction must also be considered carefully. Evidence of care or procedures not documented in the medical record cannot be reported. To limit this effect, MPRO requested supplemental encounter data from the MDCH central encounter database. These data were combined with the medical record data to produce the results presented in this report.

Comparison of indicator rates for the 1998 EQR and 2000 EQR studies are made whenever applicable throughout this section. Comparisons were not made for PHP of Mid-Michigan or PHP of Southwest Michigan because they were reviewed as one HMO in 1998, but are now separated into two HMOs with separate reporting.

Results

One of the complications of diabetes is poor circulation and decreased nerve response. This is usually seen first in the lower extremities. A foot examination is conducted to look for evidence of skin breakdown and to evaluate for peripheral neuropathy. These complications may lead to infections that do not respond well to treatment. Amputation can ultimately result. The weighted aggregate rate for at least one foot examination during the review period was 45%. This rate was below the 1998 EQR weighted aggregate rate of 51%. M-Care and Care Choices HMO rates were substantially higher than other health plan results at 72%. They also had the 2 highest foot examination rates for the 1998 EQR study. Results for other health plans ranged from 30% to 58%. Three of the health plans that were ranked in the upper-range also had results above the weighted aggregate in the 1998 EQR review.

Figure 4.1
One or More Foot Examinations

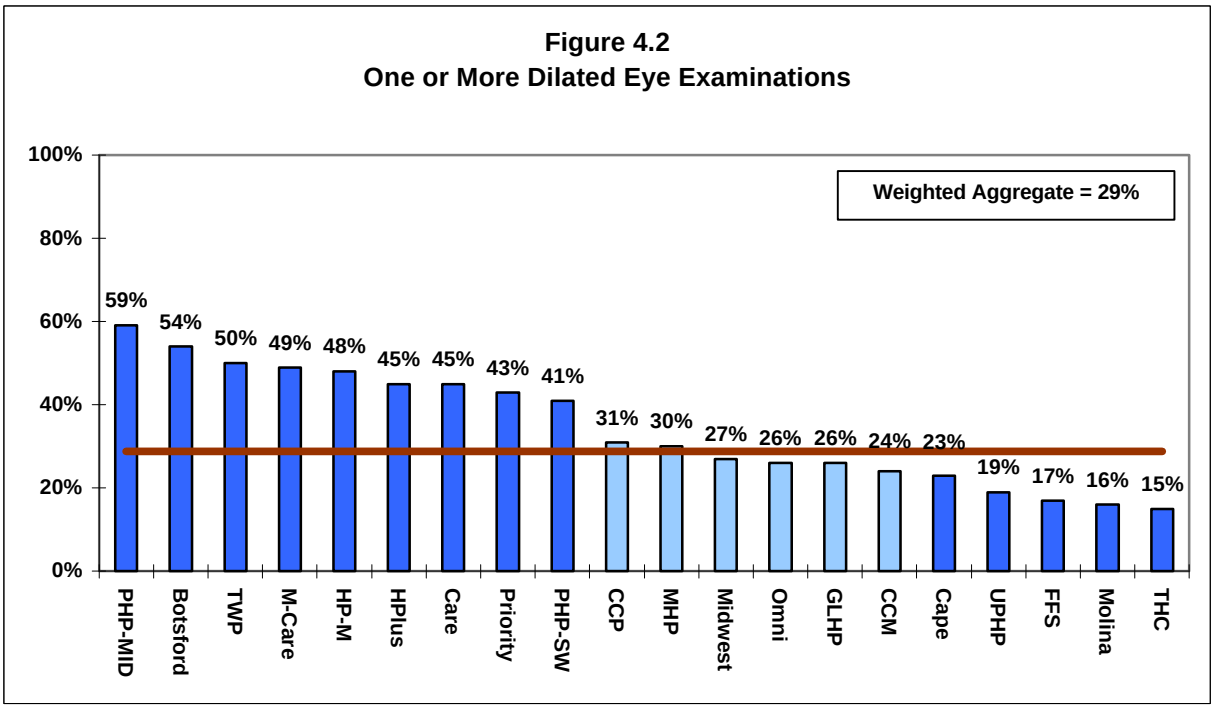


A dilated eye examination is necessary to look for retinal damage that occurs as a result of blood vessel breakdown. This complication is referred to as diabetic retinopathy. Diabetic retinopathy can cause swelling of the retina and blurred vision and can lead to blindness. Without dilation, the health care provider is not able to fully visualize the retina. A positive response for this indicator required that the medical record clearly state that a dilated eye examination was completed during the review period or that supplemental encounter data confirmed the same. A notation of referral, without evidence of occurrence, was not accepted. The medical record also needed to include documentation specifying that the examination included dilation. It is possible that the dilated eye examination rate is understated due to poor documentation in the medical record. To minimize

this effect, encounter data were used to supplement medical record data. The codes used to identify these exams were taken from *HEDIS 2000 Technical Specifications*.[3]

As shown in Figure 4.2, the weighted aggregate rate for dilated eye examination was 29%. Nine health plans had rates above the weighted aggregate; 5 fell below weighted aggregate in the lower-range. The 2000 EQR rate was higher than the 1998 EQR weighted aggregate of 24%. HealthPlus of Michigan was the only health plan ranked in the upper-range for both years.

Figure 4.2
One or More Dilated Eye Examinations

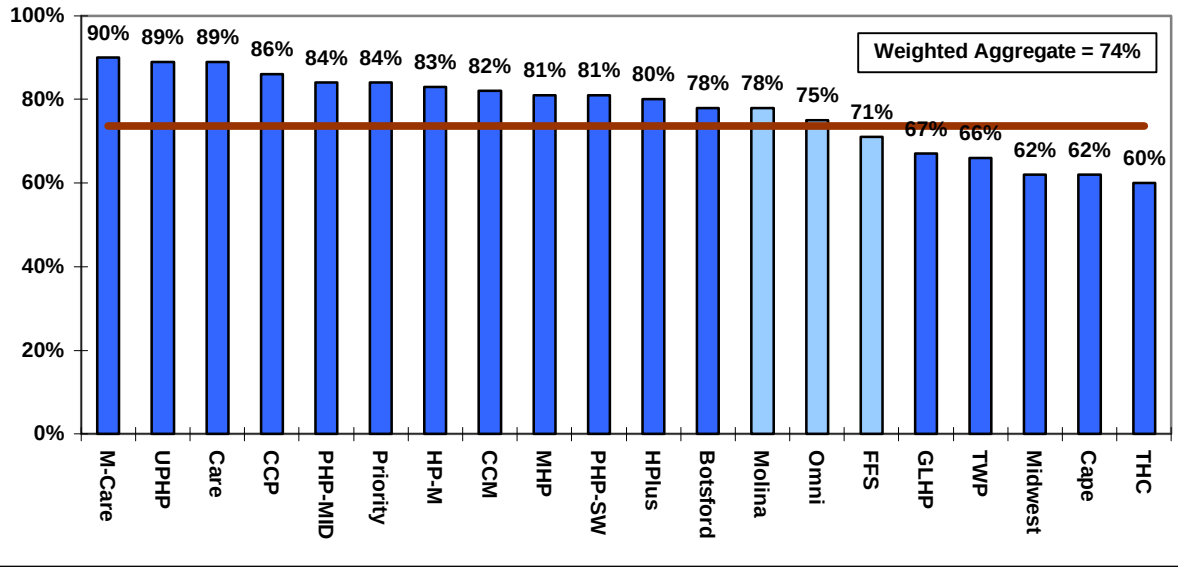


It is interesting to note that the average rate reported in the Michigan Medicaid HEDIS 2000 statewide analysis report for this indicator was 36%. Further investigation is necessary to determine the rationale for the difference in rates.

[3] National Committee for Quality Assurance, HEDIS 2000 Technical Specifications, 1999, p.91-97.

Glycosylated hemoglobin (HbA1c) testing provides information regarding blood glucose levels over a 3 to 4 month period. Complications related to diabetes may be prevented, or at least delayed, by proper blood glucose control. HbA1c testing provides the measure that evaluates the control of blood glucose over time. Wide fluctuations in blood sugar levels that may not be found by timed fingerstick glucose testing can be diagnosed using HbA1c testing. HbA1c testing results can be used to monitor compliance with diet, the effectiveness of oral hypoglycemic medications, and may also be used to make treatment decisions. The weighted aggregate rate of glycosylated hemoglobin testing was 74%. The Michigan Medicaid HEDIS 2000 aggregate rate in Michigan was 64%.[4]

Figure 4.3
One or More Glycosylated Hemoglobin Tests

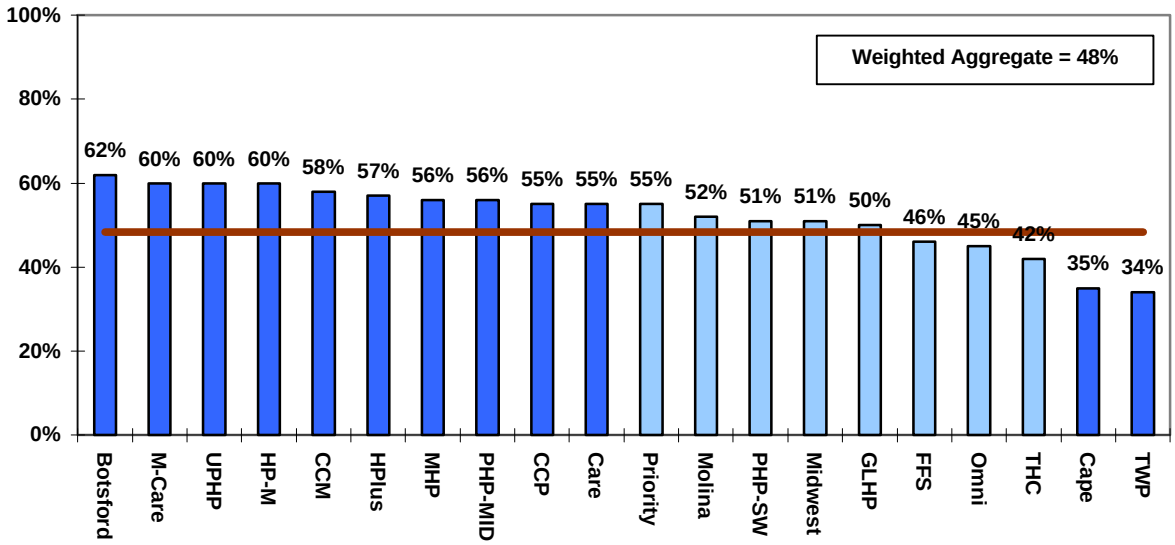


This is an increase from the 1998 EQR weighted aggregate rate of 60%. Priority Health Plan, HealthPlus of Michigan and Botsford Health Plan showed a significant increase for 2000 EQR moving from the mid-range to the upper-range relative to the aggregate.

[4] MDCH, Statewide Analysis Report, Medicaid HEDIS 2000 Results for 18 Key Measures, January 2001.

Heart disease is the number one cause of death in persons living with diabetes.[5] Cholesterol and triglyceride monitoring, at least annually, is essential to help control heart disease in this population. In order to make appropriate decisions about diet and medication therapy, physicians routinely order lipid profile testing. A lipid profile typically includes total cholesterol, high density lipoprotein (HDL), low density lipoprotein (LDL), and triglyceride levels. LDL and very low density lipoprotein (VLDL) are typically calculated using the other elements of the test, which are directly measured in the blood. Increased LDL and decreased HDL levels place individuals with diabetes at much greater risk of developing heart disease. Researchers are unsure about the role of triglycerides in the development of heart disease, but increased levels are associated with higher LDL and lower HDL levels. Monitoring these levels and providing timely intervention may help decrease the risk for heart disease in those individuals with diabetes. The 2000 EQR weighted aggregate rate of 48% was higher than the 1998 EQR result of 42%. The increase may be a result of increased awareness of the impact of cholesterol screening and treatment on the prevention of heart disease.

Figure 4.4
Lipid Profile

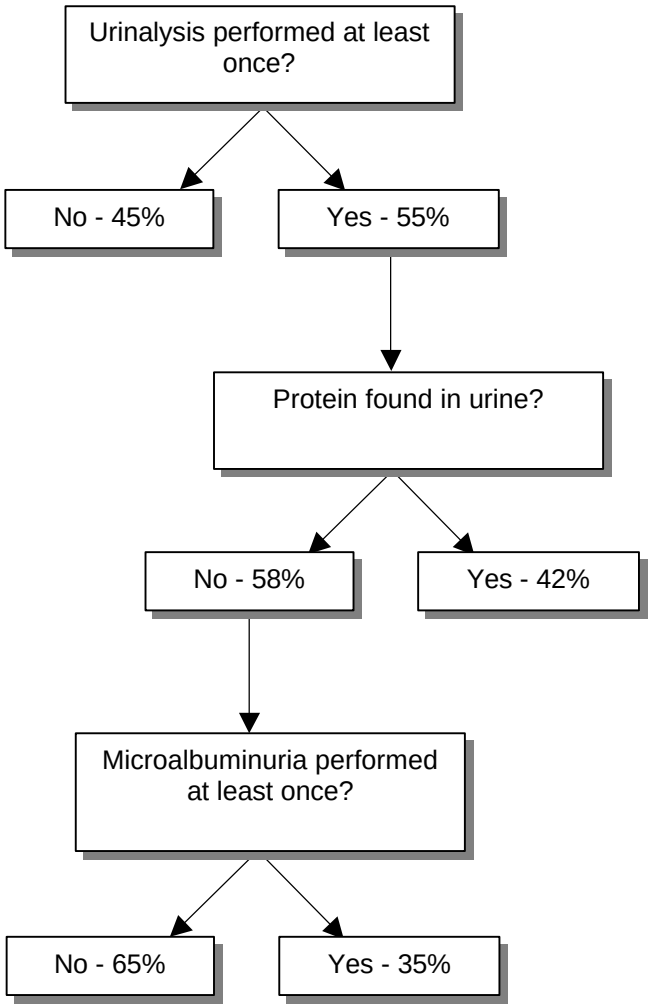


Nine of the twelve HMOs, where comparisons were made to the 1998 study, remained in the same range relative to the aggregate from 1998 EQR to 2000 EQR. M-Care, Botsford Health Plan, Care Choices HMO, and HealthPlus of Michigan improved relative to the aggregate and moved from the mid-range to upper-range. Community Choice Michigan remained in the upper-range relative to the aggregate.

[5] D'Arrigo, Terri. Cholesterol: The Good, The Bad, and The Ugly. [Web Page] 1999; http://www.diabetes.org/main/community/forecast/pg542.jsp. [Accessed 12 Nov 2001].

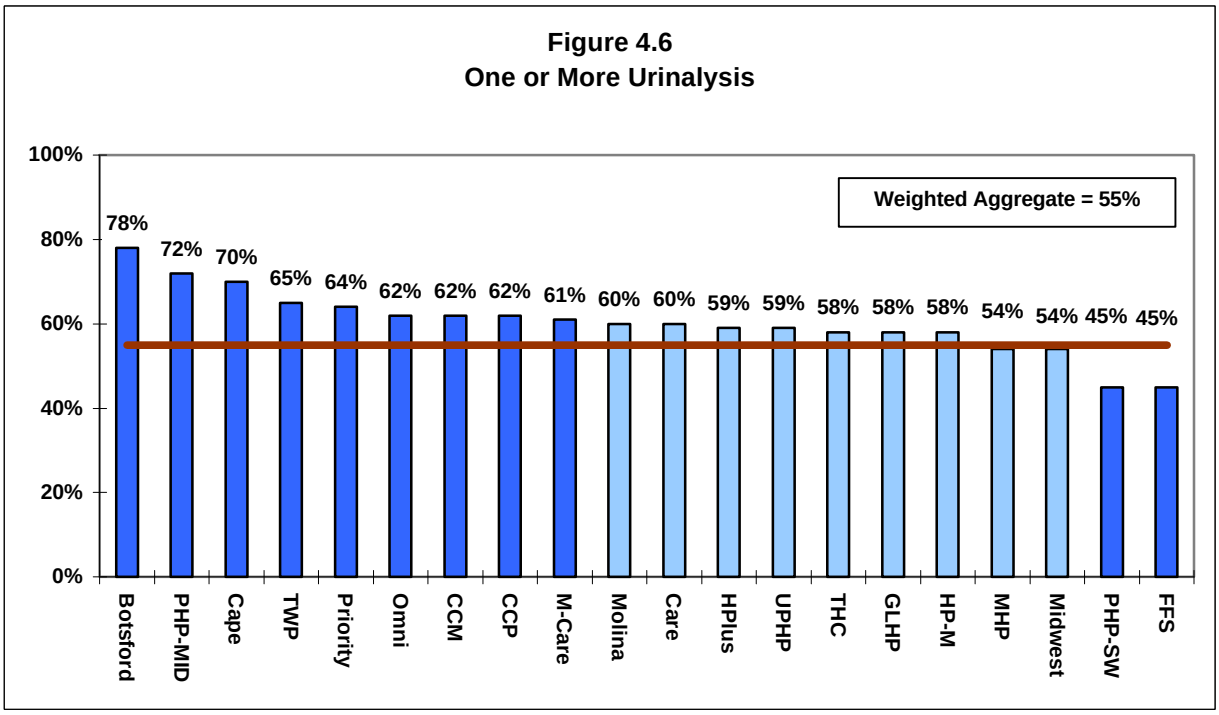
Urinalysis testing is undertaken to detect the presence of protein in the urine. Evidence of protein in the urine may indicate poor kidney (renal) function. A more sensitive test used to check for protein in the urine is a microalbuminuria test. Because microalbuminuria testing is relatively expensive, its use is recommended only when a urinalysis does not indicate the presence of protein in the urine. Diabetes is now considered the number one cause of end-stage renal disease. Periodic urinalysis and microalbunuria testing enables physicians to diagnose renal disease more promptly and initiate treatment aimed at preserving renal function. The following flowchart (Figure 4.5) identifies the breakdown of responses evaluating renal function as a result of medical record abstraction, in the form of a weighted aggregate.

Figure 4.5



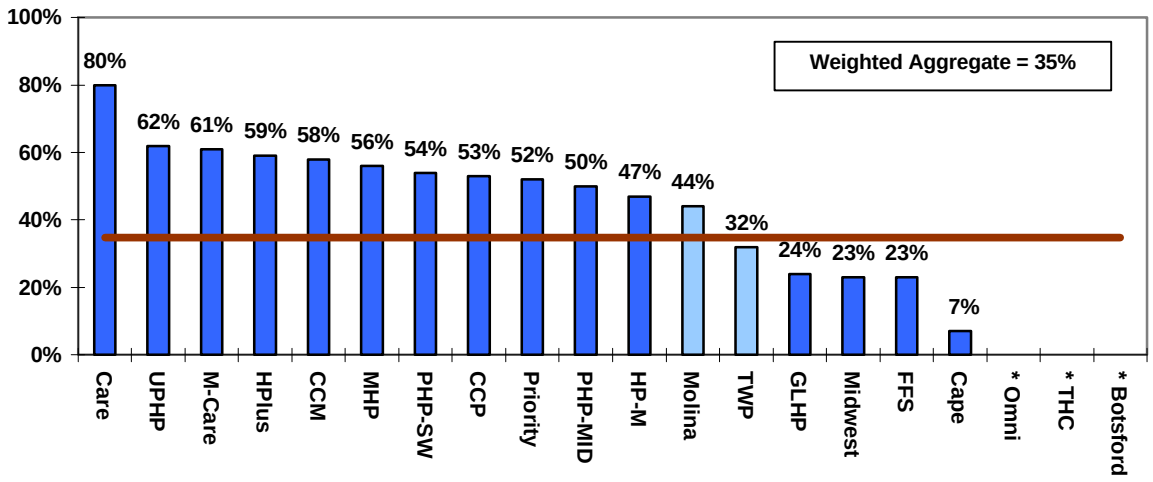
Individual health plan results for urinalysis testing ranged from 45% to 78% as shown in Figure 4.6 below. Six health plans improved significantly, moving from the mid-range to the upper-range relative to the aggregate when comparing 1998 EQR to 2000 EQR. Those health plans were OmniCare Health Plan, Cape Health Plan, Priority Health Plan, Botsford Health Plan, Community Choice of Michigan, and M-Care. Two of the health plans, Great Lakes Health Plan and Midwest Health Plan, moved from the lower-range to mid-range relative to the aggregate. The Wellness Plan was the only health plan to rank in the upper-range for both review periods.

Figure 4.6
One or More Urinalysis



Rates for microalbuminuria testing also improved from 1998 EQR to 2000. The 2000 EQR weighted aggregate rate of 35% was 22 percentage points higher than the 1998 rate. Microalbuminuria testing was reviewed in the medical record only when the urinalysis results showed no protein. The enrollees with no urinalysis or microalbuminuria test documents in the record were reviewed for encounters in the DCH encounter database. In addition, those individuals with known renal disease were also eliminated from the denominator. Care Choices was the only health plan with rates significantly higher than the aggregate for both review periods. HealthPlus of Michigan and Community Choice of Michigan demonstrated significant improvement by moving from the mid-range to the upper-range in comparison to the aggregate. The denominators from three of the health plans were too small to be used for comparisons to the aggregate.

Figure 4.7
One or More Microalbuminuria Tests

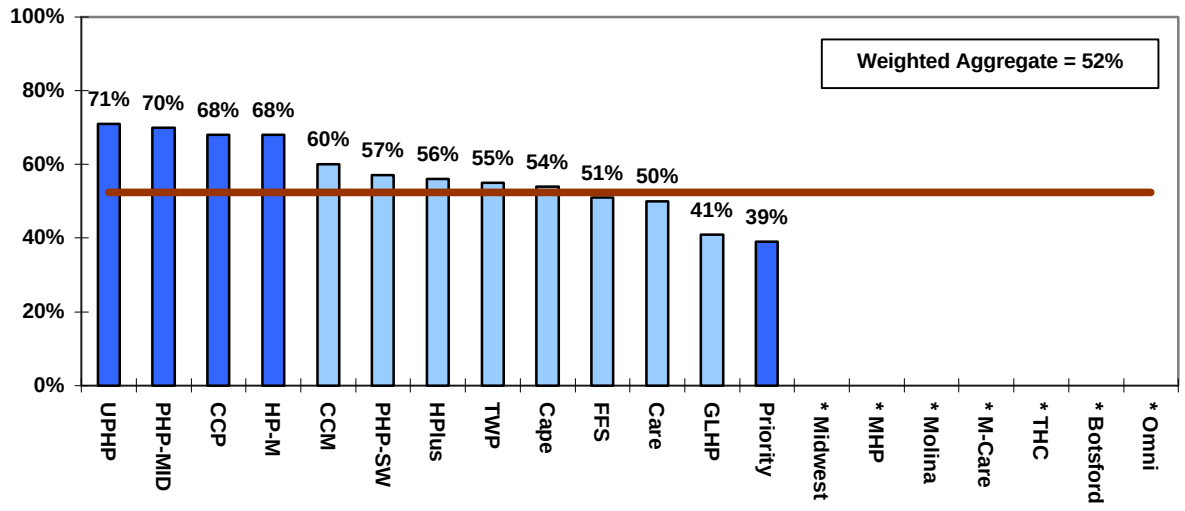


* Rates not displayed; based on sample or population < 30.

The diabetes patient is at increased risk for heart disease due to poor circulation and blood vessel damage. The use of tobacco products – cigarettes, cigars, chewing tobacco – increases the risk of heart disease; therefore, it is especially important that health care providers advise patients with diabetes to stop smoking. Smoking contributes additional risk due to the narrowing of blood vessels over time. It is imperative that individuals eliminate as many risk factors as possible to decrease their risk for heart disease.

The 2000 EQR results showed that the tobacco use status of 50% of enrollees was recorded in the medical records. The weighted aggregate rate for enrollees being advised to quit smoking (when applicable) was 52%. The denominator for this indicator was based on the subset of enrollees who smoked during the review period; therefore, results for seven health plans are not reported due to the small sample size. The 2000 EQR rate for advice to quit smoking was 5 percentage points above the 1998 EQR weighted aggregate rate of 47%; however, the difference is not statistically significant. Results for the individual health plans are shown in Figure 4.8 below.

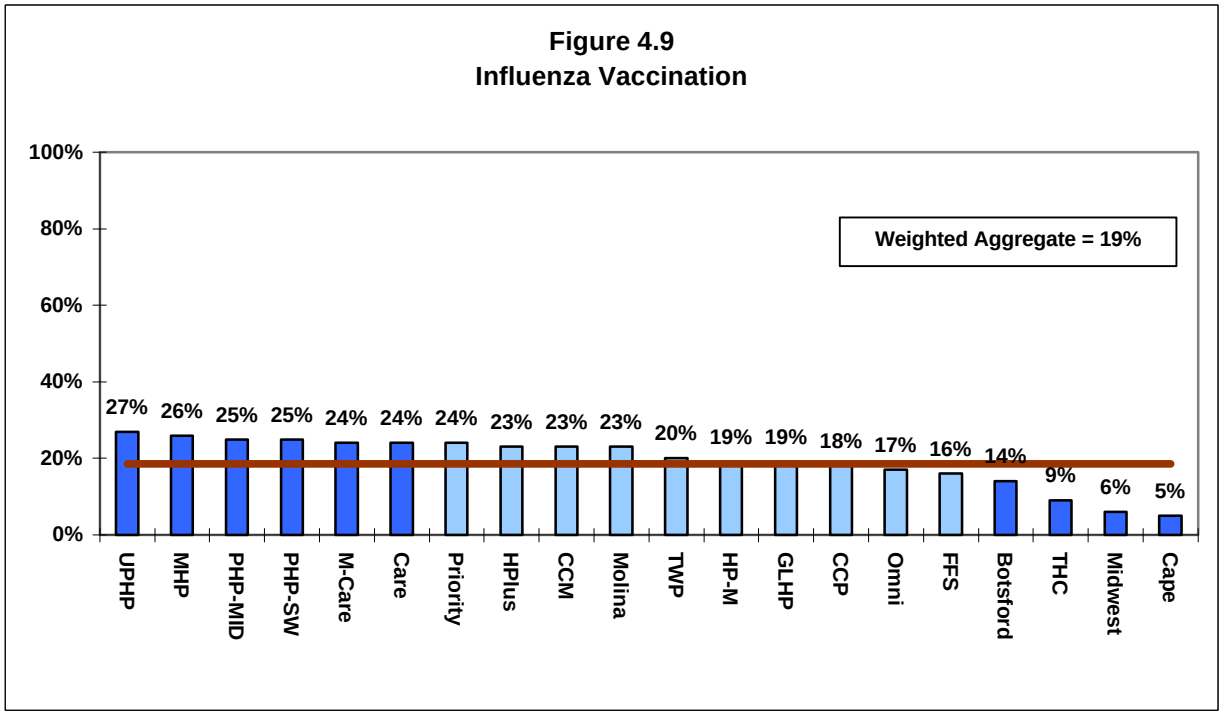
Figure 4.8
Advised to Quit Smoking



* Rates not displayed; based on sample or population < 30.

Influenza vaccination is highly recommended for patients with diabetes. Diabetes may cause abnormalities in immune system function and increase morbidity and mortality from infection. Patients with diabetes, especially those with cardiac and renal disease, are at a high risk for complications and hospitalizations related to influenza. Healthy People 2000 established a target rate for influenza immunization for people with diabetes of 60%.[6] Difficulty in achieving this goal may be directly attributed to the lack of vaccine delivery systems in all aspects of the public and private sectors.[7] This was especially true during the 2000 influenza season when a nationwide shortage of influenza vaccine was noted. This shortage may have had a negative impact on the immunization rates as demonstrated in the findings from the 2000 EQR. The weighted aggregate rate for influenza vaccination for 2000 EQR was 19%. This was similar to the 1998 EQR weighted aggregate rate of 20%. Community Choice Michigan was the only comparable health plan that ranked in the upper-range for 1998; 6 health plans demonstrated results above the weighted aggregate for 2000 EQR.

Figure 4.9
Influenza Vaccination



[6] American Diabetes Association. OP.CIT.
[7] American Diabetes Association. OP.CIT.

Discussion

The rates for the various indicators used to describe care to enrollees with diabetes varied considerably among the health plans. One reason for the range of results could be the presence of diabetic disease state management programs at the health plans. A causal relationship between disease management programs and clinical health outcomes was not evaluated as part of this EQR study, but could be considered for future studies.

Figure 4.10
Historical Diabetes Indicator Results

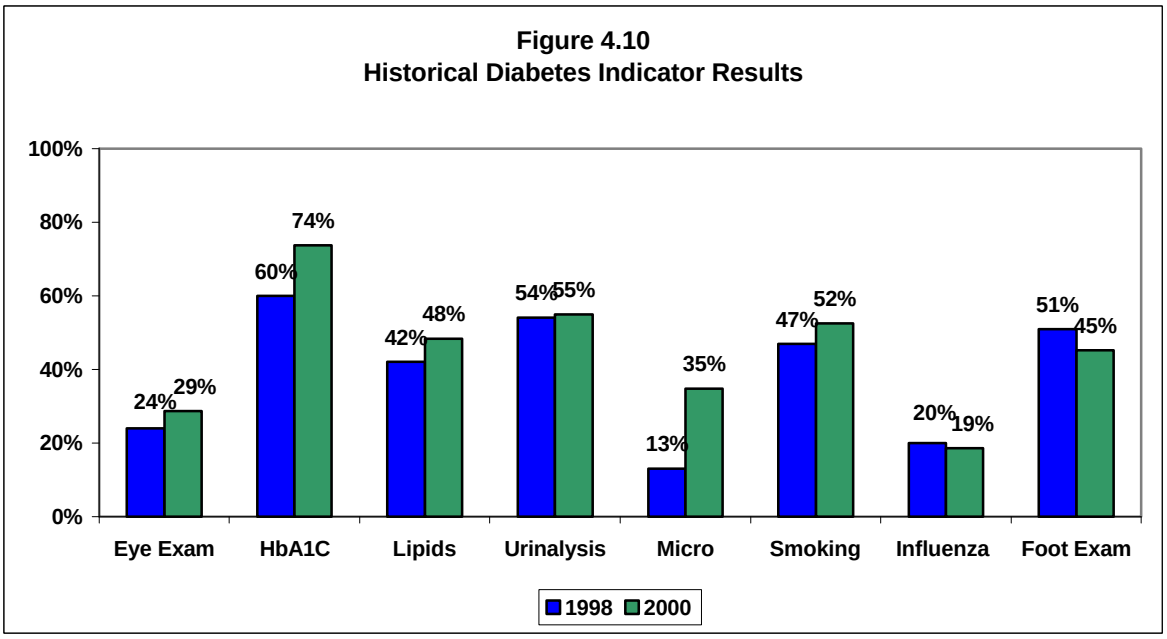


Figure 4.10 highlights the trends in the key indicators from the 1998 and 2000 EQR diabetes reviews. Four of the 8 key indicators demonstrated a statistically significant increase when compared to 1998 EQR. Three of the indicators — urinalysis testing, smoking, and influenza immunization — demonstrated no significant change when compared to 1998 EQR, while a decrease was noted only for the foot examination rate.

Although there was a widely publicized shortage of influenza vaccine in 2000, there was no significant change in the immunization rate compared to 1998 EQR. While a slight increase was noted for the advice to quit smoking indicator, it was not statistically significant. A significant increase was noted, however, for the lipid profile indicator. This may be a result of the increase in awareness of the factors related to heart disease, and the role of prevention, especially in the vulnerable population. Future evaluation is necessary to develop more definite trending information. A marked increase was also noted in the rate of microalbuminuria testing for the diabetes study. Glycosylated hemoglobin testing demonstrated a 14 percentage point increase. The indicator for dilated eye examinations also demonstrated a significant increase compared to 1998 EQR. This increase in 4 of the key measures is an indication that the health plans have improved the clinical management of persons with diabetes.